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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/586,981	06/05/2000	Jeffrey M. MacDonald	320727.50201	8826

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EXAMINER

DEAK, LESLIE R

ART UNIT	PAPER NUMBER
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3762

DATE MAILED: 01/07/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/586,981

Applicant(s)

MACDONALD ET AL. 

Examiner

Leslie R. Deak

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 25 October 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-28 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 June 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 10/25/04.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

**DETAILED ACTION**

***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1- 14, 18-21, 23-27, and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,015,585 to Robinson. Robinson discloses a bioreactor with a housing 14, nutrient inlets 11 and 21, nutrient outlets 12 and 22 that allow nutrient solutions to pass therethrough, an array of coaxial semipermeable fibers 34, with compartments defined within the innermost fiber (20), between the innermost fiber and the outermost fiber (30), and outside the outermost fiber (10). See FIGS 1, 2, column 2, lines 55-65, column 3, and column 6, lines 15-25. The nutrient solutions serve as an extracellular matrix by providing nutrients required for cell homeostasis, and may contain oxygen (see column 2, lines 57-63). The nutrient solution passes through the porous hollow fibers allowing the nutrients to mix with murine hybridoma cells (which are eukaryotic cells) in section 30. Robinson further discloses that the fibers may be made of polysulfone and other polymers and the space between the fibers is 0.2 millimeters (column 4, lines 60-65, column 3, lines 50-55). The outermost chamber 10 is fed by its own inlet port 11 and outlet port 12 (column 3, lines 60-63). Cell chamber 30 is fed by a cell inlet port 31 and cell outlet port 32 (column 6, lines 16-25). The innermost chamber 20, within the intracapillary hollow fiber 24, is fed by nutrient inlet 21 and outlet

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22 (column 3, lines 30-40). Potting compounds 13 and 33 and module shell 14 separate and isolate and separate the flow entering through different ports, separating that fluid from the remaining volume of the bioreactor and distributing it to the proper area of the bioreactor (column 3, lines 38-44, 56-61, 64-67). The bioreactor illustrated in FIG 1 has a hollow tube 17cm long and a pore size of 0.2 microns, falling within the range claimed by applicant.

With regard to applicant's amended claim limitation drawn to three coaxial fibers, creating four compartments in the device; such a limitation merely duplicates the essential working parts of the Robinson device by adding another layer of compartmentalization and fiber to the previously disclosed Robinson device.

With regard to applicant's claim drawn to the method of sterilization of the bioreactor, such a limitation amounts to a recitation of the intended use of the device, and does not patentably distinguish from the prior art.

Robinson discloses the apparatus as claimed with the exception of using liver cells, the number of cells in the bioreactor, and the pore size of the hollow fibers. Robinson does, however, disclose that the bioreactor is designed for use in growing human cells, of which liver cells are an obvious subset (see column 4, lines 14-23). Therefore, since Robinson discloses the use of human cells in his bioreactor, it would have been obvious to one of ordinary skill in the art at the time of invention to use liver cells, since liver cells are a type of human cell. Furthermore, Robinson discloses that his bioreactor comprises  $5-6 \times 10^8$  cells, and a pore size of 0.2 microns, further disclosing that particular parameters of the bioreactor may be modified depending on the desired

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cell culture operation. It would have been obvious to one having ordinary skill in the art at the time of invention to vary the number of cells used in the bioreactor and to vary the pore size of the hollow fibers, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. See MPEP 2144.05.

With regard to applicant's claim that the inlets and outlets of the bioreactor are located on a first end of the housing, such a recitation amounts to a rearrangement of parts of the device. Mere rearrangement of the working parts of a device involves only routine skill in the art. See MPEP 2144.04.

With regard to applicant's claim drawn to a bioreactor with two subunits, the second subunit is a mere duplication of the previously claimed bioreactor. It would have been obvious to one of ordinary skill in the art at the time of invention to add a second bioreactor unit to the previously disclosed apparatus since it has been held that the mere duplication of the essential working parts of a device involves only routine skill in the art. See MPEP 2144.04.

3. Claims 15, 22 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,015,585 to Robinson in view of US 6,218,182 to Naughton et al. Robinson discloses the apparatus as claimed but does not disclose the method of treating a patient. Naughton discloses the process of passing plasma passing patient plasma through the bioreactor and returning it to the patient wherein the plasma is modified in the bioreactor (see column 7, lines 1-10). The method is used such that the artificial liver cells in the bioreactor perform filtering functions on the patient plasma, acting as an

artificial liver. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the hollow fiber bioreactor disclosed by Robinson in the plasma treatment method disclosed by Naughton in order to treat patient plasma with cells grown in the bioreactor. Similarly, it would have been obvious to pass the patient plasma through 2 subunits of a bioreactor since mere duplication of the steps of the method would have been obvious to one of ordinary skill in the art at the time of invention. See MPEP 2144.04.

With regard to applicant's claim drawn to a microfiber, Naughton discloses a bioreactor that may comprise nylon fibers with a diameter of 90 micrometers in order to provide a biodegradable mesh for cell implantation in the patient's body (see column 8, lines 29-40). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to add microfibers to the hollow-fiber bioreactor disclosed by Robinson in order to allow for implantation of the grown cells into the patient.

4. Claims 16 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,015,585 to Robinson in view of US 6,218,182 to Naughton et al in view of US 5,510,262 to Stephanopoulos et al. Robinson and Naughton disclose the apparatus as claimed with the exception of aeration and perfluorocarbon coating on the microfiber growth area within the bioreactor. Stephanopoulos discloses a hollow fiber cell culture device that uses a growth medium 30 in a medium reservoir 32. The medium is aerated to increase oxygen content and promote growth (see column 8, lines 20-37). Similarly, the medium can be treated with perfluorocarbon in order to increase the oxygen solubility in the growth medium, improving cell growth (see column 9, lines 20-34).

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Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to add aeration and a perfluorocarbon treatment to a portion of the cell incubation area of the bioreactor disclosed by Robinson and Naughton in order to increase oxygen solubility and cell growth, as taught by Stephanopoulos.

### ***Response to Arguments***

5. Applicant's arguments with respect to claims 5-7, 14, 19-20, and 23-27 have been considered but are moot in view of the new ground(s) of rejection. The addition of a third coaxial fiber and an additional space between the fibers amounts to a mere duplication of the working parts of the device found in the prior art.

6. Applicant's arguments filed 25 October 2004 have been fully considered but they are not persuasive. Applicant argues that the Robinson device does not disclose a port or internal location where oxygen flows. However, applicant's argument is narrower than the device defined in the claims. The claims fail to set forth that the oxygen flowing in the instant invention are free from other fluids. Robinson specifically discloses oxygen transport in his device, though it is combined with a fluid for easy transport. Applicant has failed to claim that the oxygen transport in the instant device is oxygen that is free of other nutrients or not in solution. Therefore, the instant invention is still unpatentable over the Robinson device.

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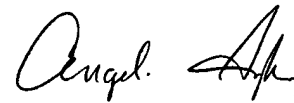
***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leslie R. Deak whose telephone number is 571-272-4943. The examiner can normally be reached on M-F 7:30-5:00, every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Angela D. Sykes can be reached on 571-272-4955. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Lrd   
30 December 2004



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